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The Impact of Kinship Networks on the Adoption of Risk-Mitigating Strategies in Ethiopia

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Summary. — The adoption of certain farm management practices, such as tree planting and soil and water conservation, can reduce exposure to weather shocks. However, in many countries the adoption of such risk mitigating measures is far from complete. We explore how risk-sharing networks in the form of kinship, characterized by the moral imperative of within-group sharing, affects the adoption of risk mitigating activities in rural Ethiopia. We find suggestive evidence that compulsory sharing invites free riding and attenuates incentives for self-protection against weather shocks. We also find evidence of the existence of a possible substitution effect between credit and social networks.

Key words — kinship, compulsory sharing, drought, flood, Ethiopia, Africa

1. INTRODUCTION

Farmers in the Horn of Africa are exposed to regular weather shocks (Intergovernmental Panel on Climate Change (IPCC), 2007). Various farm management innovations, such as tree planting and soil and water conservation, are available to reduce exposure to such shocks, but their uptake is far from complete. This is perhaps puzzling, in light of limited opportunities for smoothing consumption via "formal" financial and insurance markets.

Self-protection and risk-sharing via informal community and family structures are the most prominent approaches to reducing exposure to risk.[1] Informal sharing arrangements have been analyzed by economists in detail. Such sharing usually focuses on self-enforcing arrangements as subgame-perfect equilibria of repeated games, where binding participation and incentive constraints typically imply limited mutual insurance possibilities.[2] Alternatively, income pooling and redistribution can be organized in extended family or kinship networks. These relations are determined via bloodlines or marriage and therefore "are not the result of individual choice" (La Ferrara, 2007). This is an important difference between kinship groups and other types of groups, where individuals can choose to participate, or not.[3]

The extended family is one of the key components of social capital throughout Sub-Saharan Africa. Kinship represents a primary principle of social organization, regulating access to resources and services, and governing social relationships and marital customs. Redistribution of assets (sharing) within the network is a prominent means to provide economic and social security to kinship members. Kinship may matter because "the ties of common experience, altruism, and heritage among family members enable families to transcend some of the information problems barring the development of impersonal markets" (Rosenzweig, 1988, p. 1167). Moreover, blood relations promote altruism (e.g., Hamilton, 1964). Foster and Rosenzweig (2001) extend the basic mutual insurance under the imperfect commitment model, and consider the implications of altruism entering in sharing relations. Altruism tends to ameliorate commitment problems, and increases the potential gains from income pooling and mutual insurance.

Information advances or altruistic preferences probably imply gradual differences between kin and friendship networks. In addition, and more importantly for our purposes, kin networks may be different because they define *sharing obligations* for kin members (see below). While compulsory sharing within a kin network reduces idiosyncratic risk for members, this service comes at a cost because of several adverse incentive effects. Specifically, compulsory sharing of kin members invites free riding behavior—reducing incentives for self-protection as members can fall back on others. Of course this is not unlike the classical moral hazard problem in other insurance contexts. Moreover, compulsory sharing may attenuate incentives for hard work as excelling members are prone to be approached for assistance by their kin.[4]

In this paper we focus on the potentially adverse effects of kinship linkages in the context of self-insurance against weather shocks in Ethiopia, in the horn of Africa.[5] Redistribution implies shifting resources toward households that are worst affected by droughts and floods. Importantly, droughts and floods are *systemic risks*, affecting many members of the network simultaneously, limiting the scope to pool risks via local, informal mechanisms. While the impact of weather shocks can be, to some extent, buffered by the adoption of risk-mitigating technologies, free riding introduces a social dilemma in the

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network. Low levels of mitigating effort may emerge as an equilibrium outcome. However, cutting back on self-protection is arguably not a socially optimal equilibrium strategy, as this would imply there are no unaffected community members to provide net transfers when disaster strikes.

The main objective of this paper is to explore whether sharing norms within kinship networks imply adverse incentive effects for the adoption of specific technologies. Specifically, we seek to understand whether kinship obligations are correlated with the adoption of technologies that reduce exposure to weather risk (drought and floods)—*ex ante* risk mitigation. To do this, we test whether larger kinship networks are associated with reduced investments in self-protection against weather shocks. We establish a statistical relationship between investments in tree planting and soil and water conservation on the one hand, and the size of one's kinship network on the other.

The paper is organized as follows. In Section 2 we briefly discuss why kinship may affect productive and protective investments, and highlight the key tradeoffs for kin members. In Section 3 we hone in on the impacts of climate change for farmers in the horn of Africa—Ethiopia in particular—and discuss the various innovations that are available for farmers to partially self-protect against some of the relevant weather shocks. In Section 4 we present our data and outline our empirical strategy. Section 5 presents the main results, focusing on the drivers of adoption in Ethiopia and, in particular, on the role of kinship. Section 6 concludes.

2. THE MORAL ECONOMY OF KINSHIP

Within kinship networks, individual members may claim assistance from others when necessary. In this respect, Scott (1976) refers to the "moral economy" of societies characterized by kinship relations, Baland, Guirkinger, and Mali (2011) refer to "forced solidarity," and Hoff and Sen (2006) mention "social contracts" (see also Bloch, 1973). The moral element of kinship ties is underlined by Gulliver (1971, p. 217) who remarks that the statement "you must help a man because he is your kinsman" has the same constraining quality as the statement "you must cultivate because you need food to live." Platteau (2000) discusses the role of witchcraft, ostracism, and other social sanctions to support them. "To fail in kinship obligation is to be a witch…, in other words to be the opposite of a moral being: a murderer, a bestialist, a lover of death, etc." (Bloch, 1973, p. 78). Social stigma as well as retaliation "can thus fall on the defectors as well as on other members of their clan, increasing the cost of breaching the contract" (La Ferrara, 2003, p. 1733).

This anthropological perspective—sharing without reckoning—suggests a safety net for the unlucky that is immune to selfish calculation. However, this perspective may be romantic or naïve, as it discounts all economic reasoning and associated free riding issues. Some empirical evidence, albeit very limited, is available to support this concern.[6] Theorizing about free riding in the context of kinship networks is complex, and beyond the scope of this paper. However, some important insights can be gleaned from two papers by Alger and Weibull (2010, 2012). Their base model may be interpreted as dealing with the case of two family members who have to decide about the optimal level of self-protection against (weather) shocks. Individuals can undertake "effort" to reduce the risk of earning a low income in case a weather shock occurs, but this effort comes at a private cost. In case a shock affects the income of one of the family members, a sharing rule dictates that the other individual should provide assistance in the form of a specific transfer. Family members are altruistic and care about each other's well-being, so they are willing to provide some assistance. What happens when the sharing norm prescribes a transfer that exceeds the one that would be voluntarily provided?

Alger and Weibull demonstrate the level of effort varies with the level of altruism.[7] They distinguish between the so-called *empathy effect* of sharing within the kin network (driven by altruism), capturing the incentive to support one's kin (and reduce the probability of having to draw on one's kin's resources) and the so-called *free-rider effect*. This free rider effect is associated with forced sharing, and captures both the ability to live off the efforts of kin, as well as the disincentive to put in effort because there is always a risk that the returns of such investments will have to be shared with kin members with low payoffs. When the sharing norm exceeds voluntary transfers, the norm adversely affects incentives to engage in self-protection.

In what follows, we seek to test the prediction that kinship ties adversely affect self-protection. We analyze the case of tree planting and soil conservation to self-protect against weather shocks in Ethiopia, and consider the implications of variation in the number of kinship links. This is a non-trivial step from the Alger–Weibull model, because it is not immediately obvious how the case of enlarging the size of the network compares to the case of different levels of altruism. Exploring this issue, Alger and Weibull (2012) develop a model that explicitly captures the impact of enlarging the size of the network. In this model, individuals in a population are pairwise and randomly matched to other individuals—kin members and non-kin members. The share of matches involving kin members increases as the number of kin members increases. Individuals may also be matched multiple times in each period, as "the machinery applies to each combination of game and kinship relation separately." Hence, the strategic incentive effect becomes more pronounced as the share of kin members in the population increases, *ceteris paribus*. Applied to our context, if compulsory sharing dictates more generous transfers among kin members than those forthcoming because of voluntary sharing (altruism), then networks with more kin members will discourage self-protection against weather risk.

However, the assumption of random matching is obviously a simplification of the true interaction within networks. In reality, matches are "chosen" by the unlucky, who approach others from whom they may expect to receive assistance. Note that the comparative statistics of such a model are much more complex. Being a member of a dense network implies that many kin members may approach you for assistance, but simultaneously it is also true that "the unlucky" may approach many other kin members for contributions (or perhaps the transfer can be jointly paid by some subsamples of kin members). In other words, it is unclear how the sharing rule is affected. In that sense, our empirical approach is exploratory: we analyze the relation between kinship links and self-protection, and explore whether the incentive effects are sufficiently large to dominate opposite effects due to, say, dilution of the norm or altruism (but also because of additional effects, such a social learning within the network).

3. WEATHER SHOCKS AND MITIGATING RESPONSES IN ETHIOPIA

Ethiopia is one of the least developed countries in the world, with a per capita income of approximately USD 1000 (PPP). Agriculture is mainly traditional and employs more than